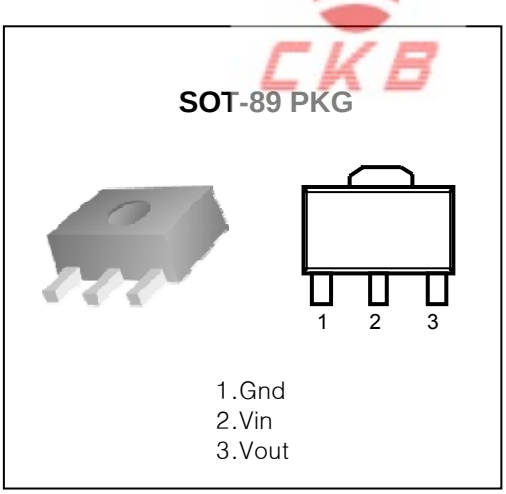
FEATURES

- Available Output Voltage 0.9V to 5.4V
- 50㎂ Quiescent Current
- Very Low Dropout Voltage of 600mV typical at 650mA
- Guaranteed 650mA Output Current
- High Output Voltage Accurate to within 1.5%
- Over-Temperature Shutdown
- Current Limiting
- Power-Saving Shutdown Mode
- Low Temperature Coefficient
- Moisture Sensitivity Level 3



APPLICATIONS

- Battery Operated Systems
- Portable Electronics
- Wireless Devices
- Cordless Phones
- PC Peripherals
- Battery Powered Widgets
- Electronic Scales

ORDERING INFORMATION

Device	Marking	Package
LM8805F-XX	805-X.X	SOT-89

X.X = Output Voltage

DESCRIPTION

The LM8805 series is a low dropout regulators operate from a +2.5V to +7.0V inputsupply.
Wide range of preset output voltage options are available. Low power consumption and high accuracy is achieved through CMOS technology and internal trimmed referencevoltage.
The LM8805 series consists of a high-precision voltage reference, error correction circuit, and a current limit output driver. The fast transient response is a cut standing feature for applications with various loads. Ground Pin Current: Typically 50μA at 650mA load current. Shutdown Mode: Maximally 1 μA quiescent current when the enable pin is pulled low. The LM8805 is stable with an output capacitance of 2.2μF or greater.
In applications requiring a low noise, regulated supply, place a 1000 pF capacitor between Bypass and Ground.

ABSOLUTE MAXIMUM RATING

Supply Voltage (Vin)	+8	[V]
Output Current (Iout)	1	[A]
Output Voltage (Vout)	Vss-0.3 to Vin+0.3	[V]

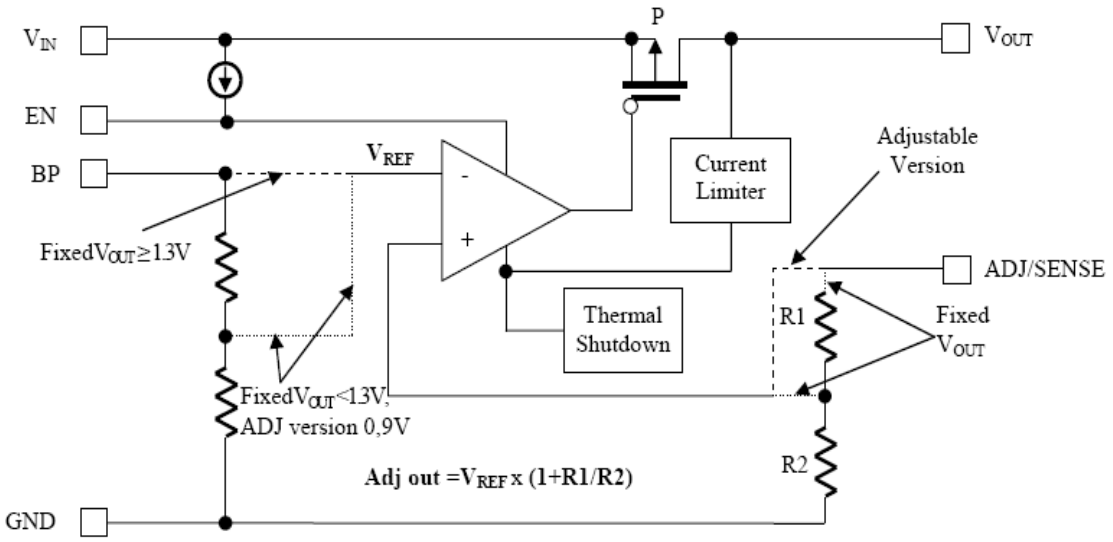
RECOMMENDED OPERATING CONDITIONS

Supply Voltage	4.5 to 5.5 V
Ambient Temperature Range (Ta)	-40 ~ +85 °C
Junction Temperature (Tj)	-40 ~ +125 °C

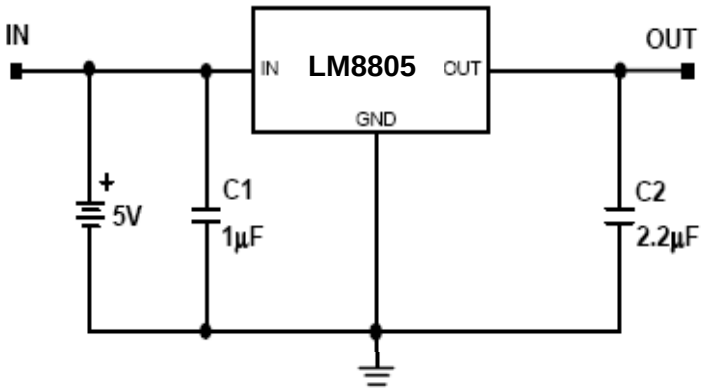
THERMAL INFORMATION

Thermal Resisitance (θja)	180 °C / W
(θjc)	18 °C / W
Internal Power Dissipation (Pd, ΔT=100°C)	550 mW
Maximum Junction Temperature	150 °C
Maximum Lead Temperature (Soldering, 10 Sec)	260 °C

FUNCTIONAL BLOCK DIAGRAM



TYPICAL APPLICATION CIRCUIT



ELECTRICAL CHARACTERISTICS

(at Ta = 25℃, unless otherwise noted)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Input Voltage Range	V_{IN}			Note 1		7.0	V
Output Voltage Accuracy	V_O	25^0C, I_0 = 1mA		-1.5		+1.5	%
		-40^0C to 125^0C, 10mA<I_O<650mA		-2.0		+2.0	%
Maximum Output Current	I_O					650	mA
Current Limit	I_{CL}	$V_{IN} = V_{OUT} + 0.6V$		900			mA
Quiescent Current	I_Q	I_O = 0mA			50	70	uA
Ground Pin Current	I_{GND}	1mA <I_O< 650mA		-70	-50		uA
Dropout Voltage	$V_{DROPOUT}$	I_O = 650mA	0.9V ≤ V_O ≤ 2.0V			1600	mV
			2.0V < V_O ≤ 2.8V			860	
			2.8V < V_O			690	
Line Regulation	REG_{LINE}	I_0 = 1mA, V_{IN}=V_O+1V to V_O+2V	V_O<2.0V			0.15	%
			V_O≥2.0V		0.02	0.1	
Load Regulation	ΔV_{OL}	10mA< I_0 <650mA				30	mV
ADJ Reference Voltage (ADJ version)	Vref			0.891	0.9	0.909	V
EN high (min), ACTIVE	V_{EH}	I_O = 10mA		1.6			V
EN low (max)	V_{EL}	I_O = 10mA				0.4	V
Shutdown Supply Current	I_{SD}	V_{OUT} = 0V				1.0	uA
Over Temperature Shutdown	OTS				160		^0C
Over Temperature Hysterisis	OTH				30		^0C
Output Noise	eN	C_{OUT} =2.2 uF			350		nV/Hz
Power Supply Rejection	PSRR	1 KHz, C_{OUT} =2.2 uF			50		dB
Output Voltage Range	V_{OUT}	0.9 ÷ 5.4 V with step 0.1 V; ADJ					
EN input current	I_{EH}	$V_{EN} = V_{IN}$, V_{IN} = 2.5V ÷ 7V				0.1	uA
EN input current	I_{EL}	V_{EN} = 0 V, V_{IN} = 2.5V ÷ 7V		-0.5			uA

Note 1 : Vin(min) = Vout + Vdropout ≥ 2.5V

DETAILED DESCRIPTION

The LM8805 family of CMOS regulators contain a PMOS pass transistor, voltage reference, error ampli-fier, over-current protection, and thermal shutdown.
The P-channel pass transistor receives data from theerror amplifier, over-current shutdown, and thermal protection circuits. During normal operation, the error am-plifier compares the output voltage to a precision reference. Over-current and Thermal shutdown circuits be-come active when the junction temperature exceeds150℃, or the current exceeds 650mA. During thermalshutdown, the output voltage remains low. Normal op-eration is restored when the junction temperature dropsbelow 120℃.
The LM8805 switches from voltage mode to currentmode when the load exceeds the rated output current.This prevents over-stress. The LM8805 also incor-porates current foldback to reduce power dissipationwhen the output is short circuited. This feature becomesactive when the output drops below 0.8 volts, and re-duces the current flow by 65%. Full current is restoredwhen the voltage exceeds 0.8 volts.

External Capacitors

The LM8805 is stable with an output capacitor toground of 2.2 uF or greater. Ceramic capacitors have thelowest ESR, and will offer the best AC performance.Conversely, Aluminum Electrolytic capacitors exhibitthe highest ESR, resulting in the poorest AC response.Unfortunately, large value ceramic capacitors are com-paratively expensive. One option is to parallel a 0.1uFceramic capacitor with a 10uF Aluminum Electrolytic.The benefit is low ESR, high capacitance, and low over-all cost.
A second capacitor is recommended between the inputand ground to stabilize Vin. The input capacitor shouldbe at least 0.1uF to have a beneficial effect.
All capacitors should be placed in close proximity tothe pins. A "Quiet" ground termination is desirable.This can be achieved with a "Star" connection.

Thermal Shutdown

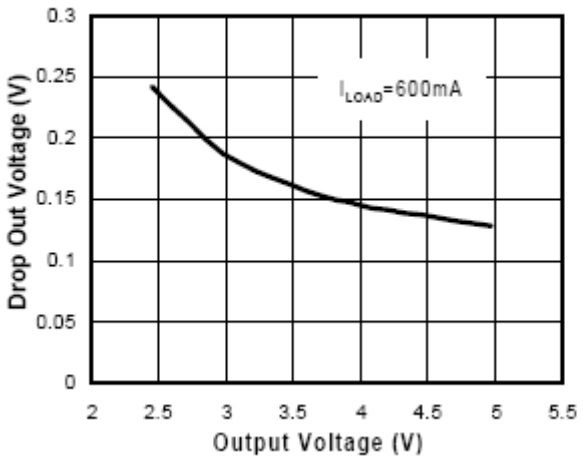
Integrated thermal protection circuitry shuts the regulator off when die temperature exceeds 150°C.
The regulator remains off until the die temperature drops to approxi mately 140°C.

Layout Considerations

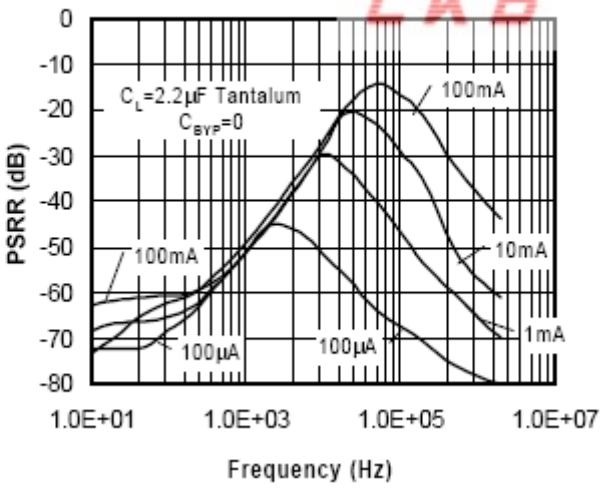
The primary path of heat conduction out of the package is via the package leads. Therefore,layouts having a ground plane,wide traces at the pads,and wide power supply bus lines combine to lower θJA and therefore increase the maximum allow able power dissipation limit.

TYPICAL PERFORMANCE CHARACTERISTICS

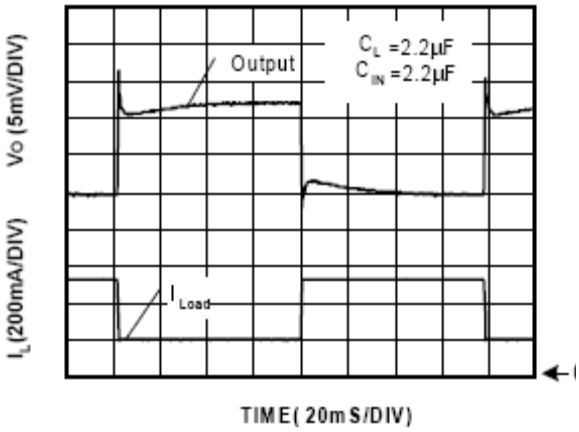
Drop Out Voltage vs. Output Voltage



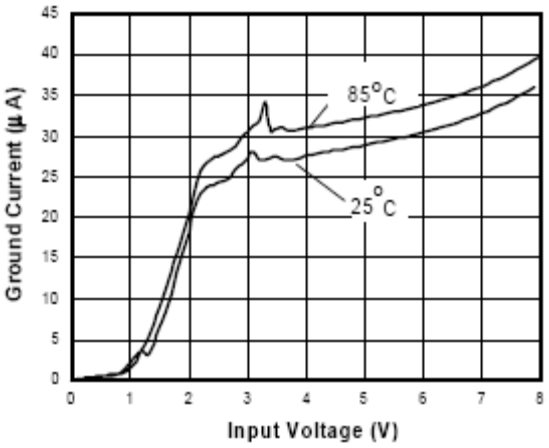
Power Supply Rejection Ratio



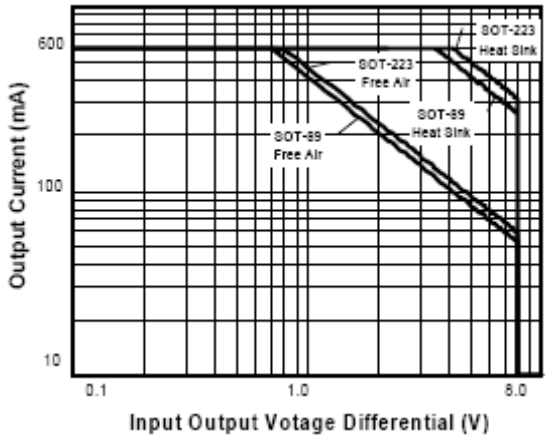
Load Step (1mA-600mA)



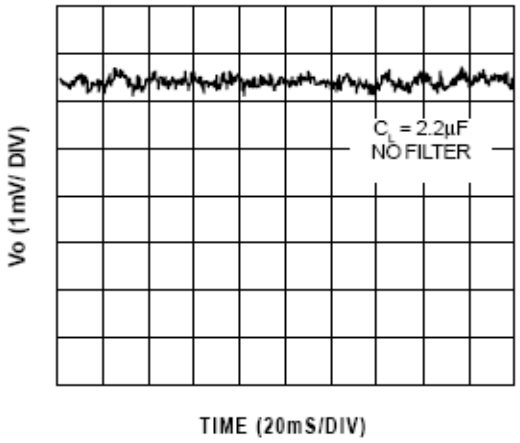
Ground Current vs. Input Voltage



Safe Operating Area

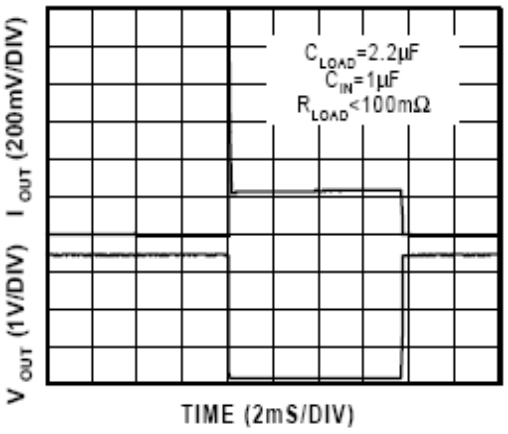


Noise Measurement

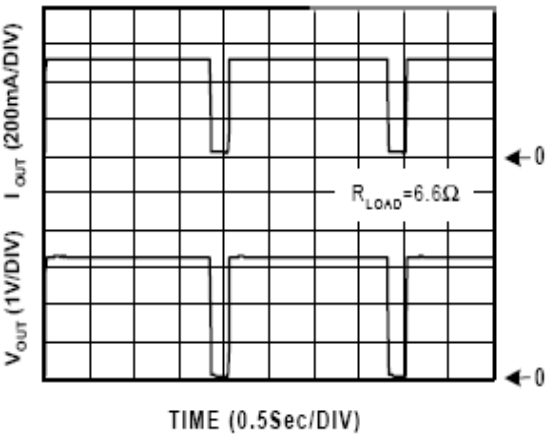


TYPICAL PERFORMANCE CHARACTERISTICS

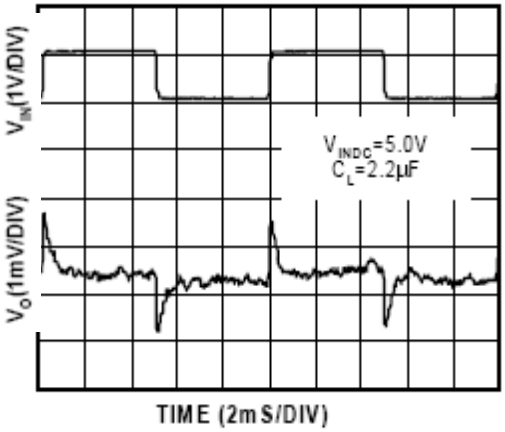
Short Circuit Response



Overtemperature Shutdown



Line Transient Response



Current Limit Response